

Flightfax

ARMY AVIATION
RISK-MANAGEMENT
INFORMATION

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The February 1997 *Flightfax* identified a killer that's stalking Army helicopter operations. This month we address controls that we need to evaluate and implement to reduce the hazard of . . .

Spatial Disorientation



Type I SD: Aircrewmembers are *unaware* that they have an inaccurate perception of their position, attitude, or motion.

During an NVG orientation flight over desert terrain in a UH-60A, the pilot began a descent from 140 feet to his planned altitude of 100 feet. He initiated the descent without informing other crewmembers nor requesting their assistance in warning him if he passed through 100 feet agl. Due to inadequate visual cues, the pilot failed to arrest his descent and struck a sand dune in a near-level attitude at 69 KIAS at a 200-foot-per-minute rate of descent. All five people on board were injured, and the aircraft was destroyed.



Type II SD: Aircrewmembers are *aware* that SD circumstances exist and must be addressed before safety of flight is irreversibly compromised.

During a night VFR departure and climbout from an unattended stagefield, the AH-64 entered IMC. The pilot on the controls, who was in the back seat, experienced spatial disorientation due to lack of visual cues. He failed to regain control before the aircraft crashed in heavily wooded terrain. He survived, but the front-seat pilot was killed. The aircraft was destroyed.

What these two accidents have in common is spatial disorientation. How they differ is that the crew in the Type-I scenario was unaware of the SD circumstances at the time of the accident, and the crew in the Type-II scenario, although aware of SD, did not react appropriately to control it.

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Reining in a hazard

Basic to any discussion of spatial-disorientation controls is recognizing that there are two types of SD. The challenge of Type I SD is to find a way to apply controls (the appropriate course of action) when you are unaware that you are in an SD situation. The challenge of Type II SD is to apply the right controls to the specific SD situation.

Identifying appropriate controls for both types of SD was an issue at last fall's Tri-Service Spatial Disorientation in Rotary Wing Operations Conference held at Fort Rucker. This conference produced control proposals in four major categories: education, training, research, and equipment. What follows is a discussion of these proposals, modified slightly to include input from the Aviation Leaders' Training Conference and the Aviation Brigade Safety Officer Conference held in January 1997 and input from standardization pilots and human-factor experts at Fort Rucker.

Proposed control: Education

Education initiatives were recommended to increase aircrew awareness of spatial disorientation through regular dissemination of lessons learned from accident analysis, research, and training. Other recommendations were to improve and standardize collection of spatial-disorientation information by accident-investigation boards.

Proposed control: Training

Training initiatives recommended included—

- **Ground-based lectures.** The thrust of this recommendation involves updating the spatial-disorientation lectures that initial-entry rotary wing (IERW) students currently receive to include information developed in the past 10 years. A cooperative effort to accomplish this is currently under way between the U.S. Army Aeromedical Research Laboratory (USAARL) and the U.S. Army School of Aviation Medicine (USASAM). Additionally, it was recommended that an SD refresher-training program be developed and instituted to emphasize the role of crew coordination and instrument flying in SD situations.

- **Ground-based demonstration of illusions.** This recommendation is based on the fact that neither equipment nor a specific helicopter profile exists for demonstrating disorienting illusions. This needs to be evaluated for feasibility of development.

- **Airborne demonstrations.** This recommendation involves evaluation of SD-demonstration flights that demonstrate the limitations of human sensory systems in flight operations. USAARL recently

evaluated a British SD-demonstration flight to determine its applicability to Army helicopter operations. The next step is a feasibility study to determine the value of including it in IERW training and refresher training.

- **Training to overcome spatial disorientation in flight.** Currently being done on an ad hoc basis, this type of training needs to be standardized for both inflight and simulator-based training with formal objectives established in a curriculum.

- **Review of ATM procedures.** This is perhaps the most important training control. Not only should we review current procedures that cover SD-related circumstances (i.e., IMC, recirculation problems such as brownout and whiteout, NVD flight, etc.), but we need to evaluate the effectiveness of crew-coordination measures already integrated into flight procedures. While it is generally agreed that crew coordination has improved the safety of flight, there has been no coordinated effort to go back and accomplish the fifth step of the risk-management process—that is to objectively assess its effectiveness to recognize its strengths and troubleshoot any problem areas. A specific circumstance that has been repeatedly raised as a worst-case scenario is the OH-58D target-engagement sequence, which requires both pilots to be “inside” the cockpit simultaneously.

Proposed control: Research

A coordinated effort is needed to evaluate the spatial-disorientation issues that are currently affecting Army helicopter operations. Toward this end, some controls identified near-, mid-, and long-term research needed to address both human-performance issues and materiel requirements.

- **Near-term issues** included tri-service standardization of terminology to enhance sharing of information, and evaluating the applicability of improved instrumentation using current technology.

- **Mid-term issues** addressed development of hazard/risk/control models to enable aircrewmembers to better risk manage SD situations in operational mission profiles. Also recommended was assessment of low-risk and low-cost technological developments that would assist pilots or be automatic in reestablishing orientation in flight.

- **Long-term issues** involved evaluating controls that need to be incorporated into the design of current and future aircraft. Also recommended was assessment of high-risk and high-cost technological developments that would assist pilots or be automatic in reestablishing orientation in flight.

Proposed control: Equipment

Equipment initiatives involve looking at both off-the-shelf and future technology to address the SD hazard.

Currently available technology that needs to be evaluated as to its adaptability to military helicopter operations includes:

■ **Audio warning on radar altimeters.** The current visual indication does not seem to be effective by itself. Controlled flight into terrain (CFIT) is the most frequent and costly (in terms of fatalities and damage) endpoint in SD accidents. This fact argues for enhancing the capabilities of current radar altimeters. In the Type I scenario described on the cover, no crewmember noticed the radar altimeter indications or radar altimeter low warning lights.

■ **Ground proximity warning system.** The role a GPWS could play in reducing CFIT needs to be evaluated. According to a recent article in *Army Aviation*¹ magazine, the Navy is in the process of testing the world's first rotary-wing GPWS. The Army currently does not have any such program.

■ **NVG heads-up display (NVG HUD).** The benefit of this technology is self-evident: It displays pertinent flight information, eliminating the need for pilots to look under the goggles to see the instrument panel.

■ **NVGs with increased field of view.** The Air Force has developed an NVG with a 100-degree field of view (compared to 40 degrees with ANVIS), which is being evaluated by ATCOM. This increased FOV would facilitate scanning and decrease neck fatigue.

■ **Hover lock.** Given that the human vestibular system is better adapted to detect rotational movement and less well adapted to detect lateral movement, it comes as no surprise that drift and descent from a hover is a significant SD problem in helicopter operations, particularly at night or during limited-visibility operations. (For the OH-58D and AH-64, this was the number-one SD situation in Class A-C accidents from 1987 through 1995.) Since the mid-1960's, the Coast Guard has had the capability to lock its position over rescue subjects. (The AH-64 has limited hover-hold capability; however, that system controls only horizontal, not vertical, drift.)

■ **Flight data recorders (FDRs) with voice capability.** While this technology would do little to help pilots reestablish orientation in flight, it would certainly help us determine what went wrong in accidents in which the entire crew perished and there were no witnesses.

Future technology that needs to be considered for development includes the following:

■ **Helicopter-specific instrument panels.** Current helicopter instrument panels are carryovers from fixed-wing aircraft. As a result, they were designed for use in aircraft with vastly different missions and flight profiles. Instrument panels that display pertinent rotary-wing flight parameters such as drift information would be helpful.

■ **Simulators capable of demonstrating spatial-disorientation situations.** Actual flight profiles that

resulted in spatial-disorientation accidents could be programmed into simulators to allow aviators to experience the SD accident sequence and then show them how to apply the appropriate controls to fly out of the situation. The Army currently has an AH-64 simulator with a virtual-reality helmet; this needs to be evaluated as a potential platform to develop an SD simulator.

Prioritizing controls

In these days of fiscal constraint, the reality is that not all these recommended controls can be evaluated and implemented immediately. We must apply some form of prioritization that gives us the most return for every dollar invested. In USAARL Report 95-25², which surveyed 5 years of Class A-C helicopter accidents, researchers recommended the following potential solutions:

Potential solution	Frequency*
Increased crew coordination	45%
Improved scanning	39%
Audio warning on radar altimeter	22%
NVG HUD	22%
Hover lock	19%
Drift indicators	14%

*Recommended by two or more of the three researchers.

(Note: Frequencies add up to more than 100% because more than one solution may have been recommended per accident.)

It is clear that these researchers felt that training controls would be more effective than equipment controls, particularly in Type II (aware) SD events. However, what is difficult to assess after an accident is the degree to which human-performance issues (fatigue, task saturation, etc.) decreased the efficiency of tasks such as crew coordination and scanning. In short, the question is: Are we addressing a symptom of the problem or the problem itself?

A follow-on USAARL study³ that extends the original 5-year review by 3½ years provides additional information that can be used in prioritizing SD controls. Table 1 displays, by phase of flight, factors that might be used as the basis for prioritization: cost in both lives and dollars and frequency of Class A through C accidents involving spatial disorientation. For example, if we made accidents involving fatalities our top priority, developing controls for controlled flight into terrain (GPWS, audio warnings on radar altimeters, crew coordination) and IMC (review of instrument flight procedures and crew coordination) would address 85 percent of such accidents. Table 1 also shows clearly that night flight (NVG, FLIR, and night-unaided) accounts for nearly three-quarters of SD-accident

losses. If that were selected as the basis for control development, controls might include review of crew coordination procedures, NVG HUD, and NVG with increased field of view. (It is imperative to state that this should not be interpreted as an indictment of

NVG, FLIR, or night-unaided flight; it is more an indication of the importance of risk management in these operations.)

Finally, it is important to stress that controls need to be prioritized not only in terms of what is good

for helicopter operations in general, but also according to the needs of specific helicopters due to their missions. The nature of SD problems can also vary according to aircraft type (see table 2). For example, while CFIT is the number-one SD problem for most helicopters, descent and drift during hover operations ranks as the most frequent SD problem for OH-58Ds and AH-64s. For the UH-60, recirculation problems (brownout, whiteout) rank as the most frequent SD problem. So while recommendations for controls for CFIT would not change for most aircraft, hover lock for AH-64s and OH-58s and review of flight procedures/crew coordination issues in UH-60s might be additional considerations.

It is important to reiterate that while flight data recorders with voice capability were not specifically cited when control recommendations were prioritized according to cost, visual cue considerations, or type aircraft, they would definitely add vital information to accident investigations.

Table 1. Class A-C Accidents Involving SD By Phase of Flight (1987-95)

	CFIT	IMC	B/W	HOV	TAXI	H2O	MISC	TOTAL
Accidents	104	22	52	76	17	7	13	291
Cost (\$M)	225	95	32	69	8	10	28	468
Fatalities	47	46	-	1	-	1	15	110

○ Frequency (Top 3): CFIT (36%) + HOV (26%) + B/W (18%)

○ Cost (Top 3): CFIT (48%), IMC (20%), HOV (15%)

○ Fatalities: CFIT (43%) + IMC (42%) = 85%

	NVG	FLIR	N-U*	DAY	TOTAL
Accidents	107	26	29	129	291
Cost (\$M)	187	102	58	121	468
Fatalities	62	0	22	26	110

*Night-unaided

Table 2. Class A-C Accidents Involving SD By Type Aircraft (1987-95)

Aircraft	CFIT	IMC	B/W	HOV	TAXI	H2O	MISC	TOTAL
OH58A/C	21	5	1	18	-	1	2	48
OH58D	3	2	1	8	1	1	-	16
UH1	21	7	10	8	1	2	2	51
UH60	15	4	25	9	9	-	3	65
AH1	16	1	9	8	-	-	2	36
AH64	17	2	3	20	3	-	1	46
H6	7	-	-	2	1	1	1	12
CH47D	4	1	3	2	2	1	2	15
CH47A/B	-	-	-	1	-	1	-	2
All Groups	104	22	52	76	17	7	13	291

○ Top 3 mechanisms: CFIT (36%), HOV (26%), B/W (18%)

○ Controls will have to review SD mechanisms by type aircraft

Legend:

CFIT - Controlled flight into terrain
IMC - Instrument meteorological conditions
B/W - Brownout/whiteout
HOV - Drift or descent from a hover
TAXI - (self-explanatory)
H2O - Drift or descent into water
MISC - Phase of flight not reported

Summary

The purpose of this article is to begin to recommend potential controls for a hazard that is contributing to a high cost in terms of lives and resources. The facts surrounding hazards, risks, and controls for spatial disorientation in helicopter operations are being elevated to appropriate agencies within the Department of the Army for consideration. While we are making consistent strides in integrating risk management into aviation operations, there is no doubt that we can do better once we rein in the spatial-disorientation hazard.

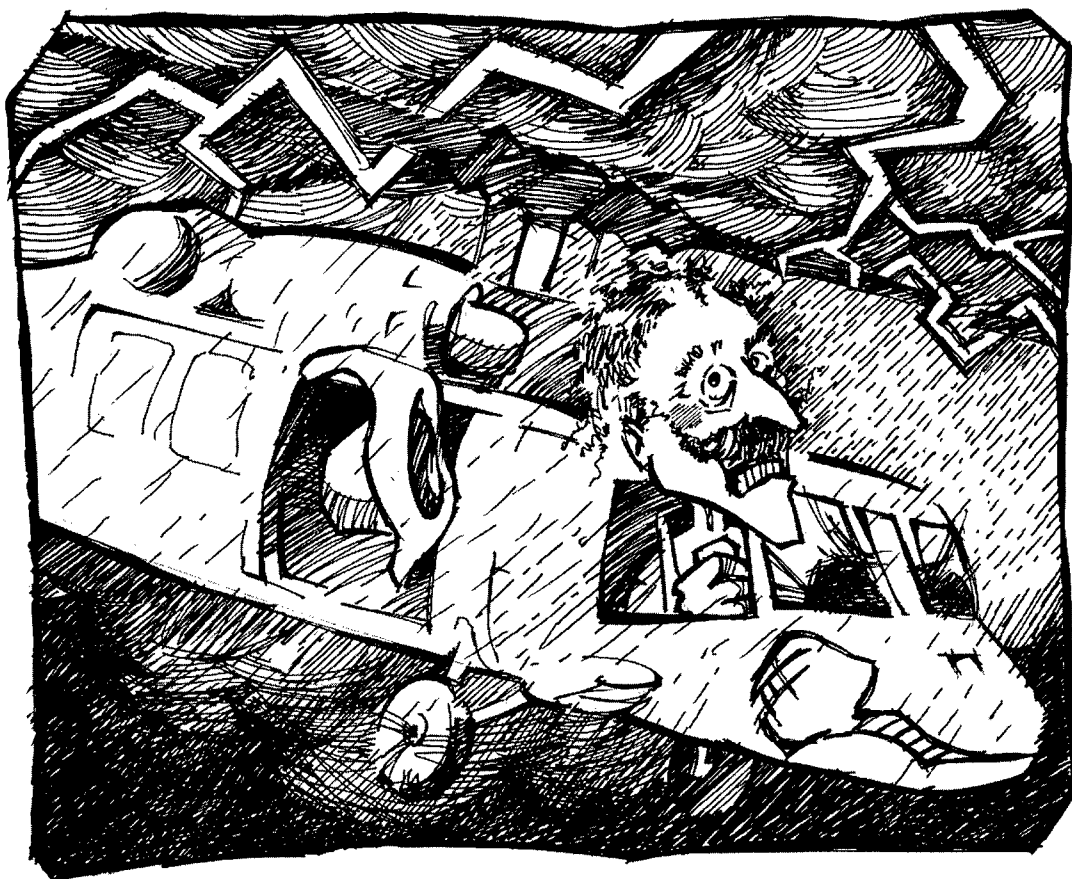
—COL Edwin A. Murdock, MD, MPH, U.S. Army Safety Center Surgeon, DSN 558-2763 (334-255-2763)

—LTC Malcolm G. Braithwaite, MB.Ch.B, DAvMed, MFOM, RAMC, USAARL Exchange Flight Surgeon, DSN 558-6815 (334-255-6815)

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- Seidenman, Paul. "Ground Proximity Warning System." *Army Aviation*. 30 Nov 96, pp. 41-45.
- Durnford, S.J., J.S. Crowley, N.R. Rosado, J.P. Harper, and S. DeRouche. *Spatial Disorientation: A Survey of U.S. Army Helicopter Accidents, 1987-1992*. USAARL Report 95-25, June 1995.
- Braithwaite, M.G. *A Review of U.S. Army Helicopter Accidents, 1987-1995*. USAARL Report 97-13, March 1997.

**Make safe flight through a thunderstorm.
Avoid the known thunderstorm area.**



◆ ◆ ◆ BUT IF YOU CAN'T ◆ ◆ ◆

Tighten your safety harness and secure all loose objects.

Plan and hold your course; keep your eyes on your instruments.

Establish a penetration altitude, either below freezing level or above minus 15°C to avoid critical icing.

Verify that pitot heat is on, and turn on carburetor heat or jet engine anti-ice. Icing can be rapid at any altitude and can cause almost instantaneous power failure.

Establish and maintain power settings recommended for turbulence penetration airspeed.

Maintain constant attitude, but let the aircraft "ride the waves". Maneuvering to maintain constant altitude increases stress on the aircraft.

Turn up cockpit lights to highest intensity to reduce temporary blindness from lightning.

Disengage altitude-hold and speed-hold modes if using auto pilot. Their use will increase aircraft maneuvers, increasing structural stress.

Tilt airborne radar antenna up and down occasionally to detect thunderstorm activity at other altitudes.

Don't turn back. Maintain a straight course through the storm.



Each new plateau of risk,
when first attained,
seems to be the last; but,
as we grow accustomed to
it, a new horizon beckons.

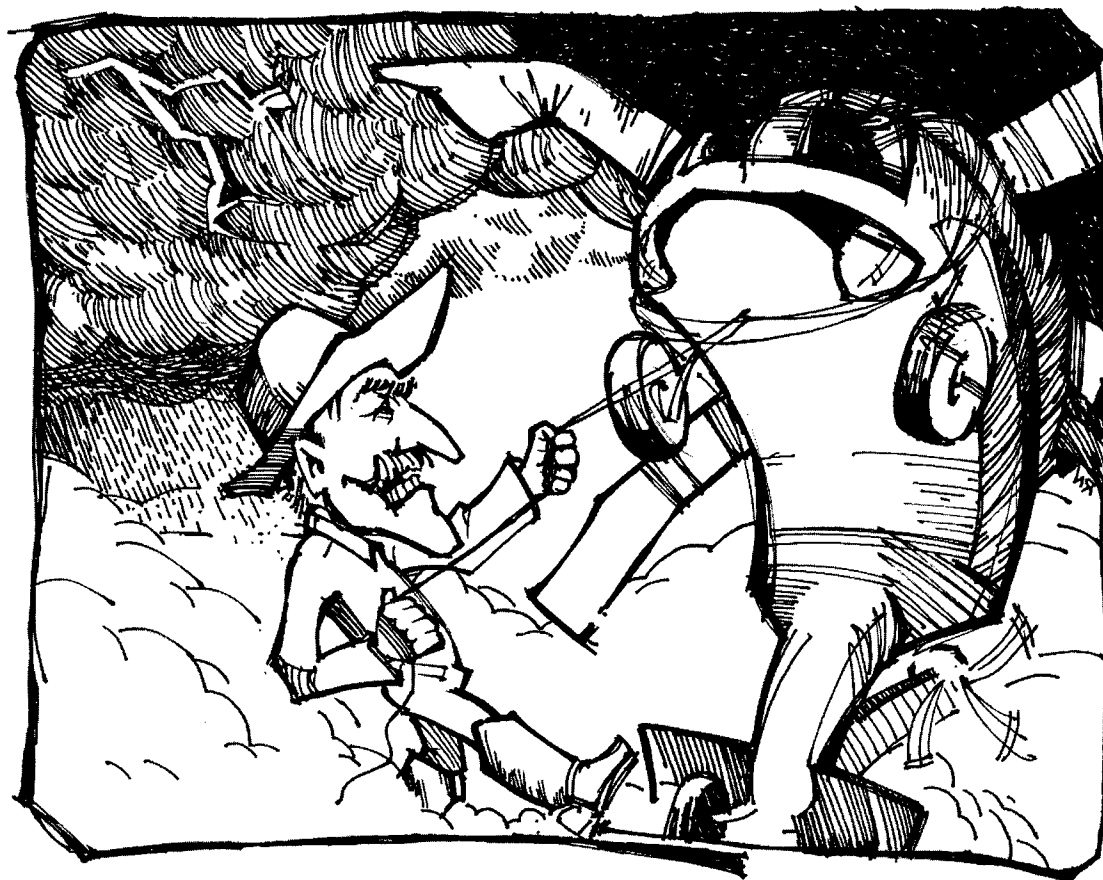
What insulates us from
fear as we approach
the danger is simply habit,
the familiarity of a point
we have reached and
all the points we've
left behind.

Until one steps too far,
it's often hard to tell
the difference between
RECKLESSNESS



een
and SKILL.

**No procedures exist that can guarantee
The safest course is always away from**



AVOID THE STORM!

Never land or take off in the face of an approaching thunderstorm. A sudden gust front of low-level turbulence could cause loss of control.

Never fly under a thunderstorm, even if you can see through to the other side. Turbulence and wind shear under the storm could be disastrous.

Never fly without airborne radar into a cloud mass containing scattered embedded thunderstorms.

Remember that *appearance* is not a reliable indicator of the turbulence inside a thunderstorm.

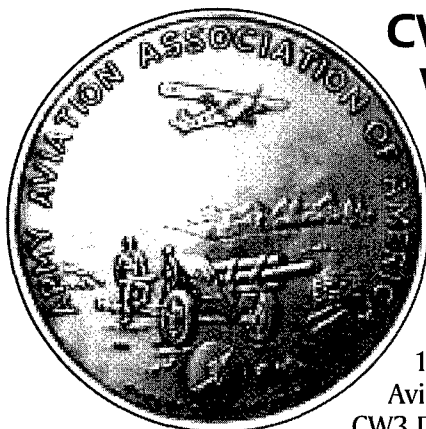
Stay at least 20 miles away from any thunderstorm identified as severe or that produces intense radar echo.

Clear the top of a severe thunderstorm by at least 1,000 feet for each 10 knots of windspeed at the cloud top.

Circumnavigate the entire area if the area has 6/10 thunderstorm coverage.

Remember that vivid and frequent lightning signals a severe thunderstorm.

Regard as extremely hazardous any thunderstorm with tops 35,000 feet or higher.



CW3 Milligan wins McClellan award

The Army Aviation Association of America has announced that the winner of the 1996 James H. McClellan Aviation Safety Award is CW3 David E. Milligan. He is with 2nd Squadron, 17th Cavalry,

Aviation Brigade, 101st Airborne Division (Assault) at Fort Campbell, KY. Formal presentation of the award to CW3 Milligan for his individual contributions to Army aviation safety will take place during the AAAA Annual Convention, 23-26 April, in Louisville, KY.

Snug-up that nape strap

A recent Army Aeromedical Research Laboratory study inspected the helmet nape straps of 420 aviation personnel. About 40 percent of the straps were improperly adjusted. A loose nape strap could allow excessive forward rotation of the helmet during an accident sequence, exposing the head to serious injury.

A snug nape strap is essential to proper helmet fit, and proper fit is critical to maximizing the helmet's protective capabilities. A snug strap also improves the earcup seal, reducing noise bleed.

All aviation personnel should be sure to cinch both the chin strap and the nape strap before each and every flight.

Address any helmet-fitting question to alserp@rucker-emh2.army.mil or call DSN 558-6895/6893 (334-255-6895/6893).

Collision-avoidance systems

Two versions of Traffic Alert and Collision Avoidance Systems (TCAS) are in use by civil aircraft. TCAS-I provides only traffic advisories. TCAS-II, however, calculates the time and point of collision and directs the pilot to climb or descend to avoid conflict. This is the system used on airliners and other aircraft with more than 31 passenger seats. There have been several reports recently of such aircraft having to take evasive action as a result of their TCAS-II being activated by military aircraft.

Except for takeoff and landing, most Army aircraft do not operate in the same flight realm as TCAS-II-equipped aircraft. Therefore, the probability of an Army aircraft activating this warning system is small. However, Army pilots must comply with the provisions of FAR 14 CFR 91.111: *Operating Near Other Aircraft*, which prohibits the operation of any aircraft—

- Close enough to another aircraft that it creates a collision hazard.
- In formation flight except by arrangement with the PC of each aircraft in the formation.
- In formation flight any time it is carrying passengers for hire.

Army flight crews must be familiar with the collision-avoidance systems in use and ensure that they maintain adequate separation from TCAS-II-equipped passenger-carrying aircraft.

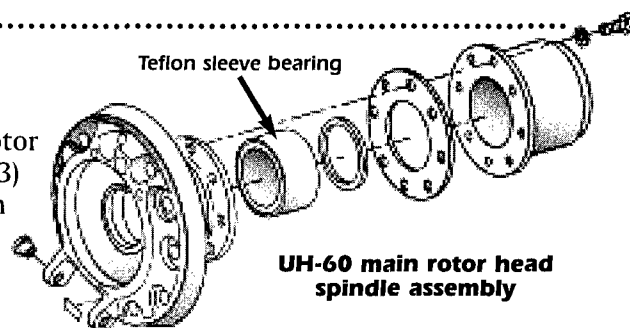
—POC: Mr. William T. Harrison, U.S. Army Aeronautical Services Agency, Fort Belvoir, VA, DSN 656-4871 (703-806-4871)

Attention Black Hawk users

According to the Jan/Feb 97 Black Hawk Newsletter, a main rotor spindle spherical elastomeric bearing (NSN 1615-01-374-7203) that was removed at phase had been installed without the teflon sleeve bearing. As a result, the spindle shank had rubbed the spherical bearing, causing considerable and expensive damage to both pieces. While there is no indication that this is a widespread problem, a couple of reminders couldn't hurt:

- Verify the presence of the sleeve bearing before installing the spherical bearing onto the spindle.
- Order spherical bearing NSN 1560-01-411-8452, P/N 70102-08200-050, which comes with the sleeve installed.

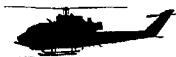
—POC: Mr. Joe Hoover, PM Utility Helicopters, DSN 693-0484 (314-263-0484)



Accident briefs

Information based on preliminary reports of aircraft accidents

AH1



Class D

F series

■ While hovering during live fire, rocket appeared to have hung fire in left inboard launcher tube. Rocket departed tube after about one second. Damage to rocket pod was discovered during shutdown.

Class E

F series

■ Aft fuel boost segment light came on in flight. Circuit breaker was pulled and aircraft returned to base. Light remained lit during 20-minute flight back to home base. Segment light went out after maintenance checked wiring harness on left side.

■ Pilot noticed object going under aircraft during approach to uncontrolled airport. Upon landing, crew found right ammo bay door open. Object pilot saw turned out to be a flight jacket that had been stored in ammo bay. Aircraft was not damaged.

■ Master caution and aft fuel boost segment lights came on during cruise flight. Maintenance replaced aft fuel boost pump.

■ Aircraft made uncommanded 90-degree left yaw while at a hover. Aircraft was controlled and turned back to original heading, then again yawed 90 degrees left uncommanded. Maintenance inspection revealed bad yaw transducer.

AH64



Class A

A series

■ Low-level flight of nine aircraft encountered bad weather at night and descended to maintain VFR. AH-64 struck wires at 70 feet agl. Crew sustained minor injuries.

Class C

A series

■ Aircraft settled about 15 feet while in battle position. PC established climb to altitude with no further incident. Postflight inspection revealed damage to all four tail rotor blades.

Class E

A series

■ Amber feed light came on during cruise flight. Crew accomplished inflight emergency procedures and returned aircraft to airport. While taxiing to parking, No. 2 engine flamed out. Normal shutdown was accomplished with no further incident. Maintenance could not duplicate incident. MOC accomplished and aircraft released for flight.

■ After departure while accelerating at 500 feet agl, torque symbology indicated 120 percent on pilot's helmet display unit and No. 2 engine tgt indicated 874°C on engine instrument console. Pilot continued forward flight and reduced collective. When No. 2 engine failed, pilot executed emergency engine shutdown and returned to home base without further incident.

■ On climbout from FARP, pilot in front seat (on controls) observed 190-percent torque on No. 1 engine and 48-percent torque on No. 2 engine. He reduced collective and attained single-engine airspeed. En route to suitable landing area, pilot observed No. 2 engine indications of 905°C tgt and 28-percent torque and retarded No. 2 power lever to idle. On short final, No. 2 engine-out caution light came on with corresponding engine-out audio sounding at 63-percent Ng. Pilot performed single-engine roll-on landing, after which crew detected fumes in crew station. Maintenance determined that No. 2 engine gas generator rotor failed. No. 2 engine was replaced.

■ During taxi to parking from refuel, No. 1 engine fire light activated and then went out. Smoke was seen coming from No. 1 engine, and aircraft was shut down. No. 1 engine primary exhaust had dislodged from engine.

CH47



Class B

E series

■ While conducting low-level NVG flight over uneven terrain, aircraft was inadvertently flown to the ground, ripping landing gear off. Aircraft was flown 1400 meters to suitable landing area and landed without further damage.

Crew did not see approaching ground due to lack of visual cues.

Class C

E series

■ Flight-related. Soldier broke left leg and ankle upon landing during fast-rope training. He was wearing rucksack and landed with feet apart.

Class E

D series

■ Crew was delivering external load when ramp tongue separated from aircraft.

■ During straight and level flight for post-phase test flight, No. 2 engine transmission debris screen latch tripped on maintenance panel and would not reset. PC placed No. 2 engine ECL in stop position, and engine shut down. Single-engine roll-on landing was made without incident.

■ Master caution and No. 2 engine chip lights came on during runup. Attempt to reset was unsuccessful. Emergency procedures were accomplished and engine was shut down with no further incident. Engine replacement was recommended by AOAP.

OH58



Class C

A series

■ Crew reported loss of engine power at 15 feet agl during takeoff from field site. Aircraft landed hard, damaging landing gear and transmission isolation mounts. Investigation in progress.

■ Rotor blades struck tree during aerial recon mission at night. Crew was unaware of tree strike and noticed no damage during postflight. Blade damage was found during daylight preflight by another aircrew.

D series

■ IP was holding stationary hover OGE under NVGs while rated student pilot was setting up for simulated missile engagement. Aircraft drifted aft about 25 feet, and tail rotor contacted tree. Damage was found during postflight.

Class E

C series

■ During cruise flight, rotor rpm

indicated zero, audio alarm activated, and master caution light came on. Aircraft landed without incident, and maintenance repaired broken wire to cannon plug for dual tach.

■ Aircraft was at 1000 feet agl and 90 knots when fuel filter caution light flickered and then came on steady. After precautionary landing, maintenance released fuel filter differential pressure switch and aircraft was released for flight.

■ After landing at civilian airfield, PC noted altimeter read 100 feet lower than elevation. Aircraft was shut down, and altimeter was replaced.

■ During run-on landing, front crosstube failed on right front just above attachment point. Groundspeed at time of failure was less than 3 knots and aircraft had started the characteristic shudder as it started to come to a stop. Aircraft was shut down without incident. Fore and aft crosstubes and right skid were replaced.

UH1



Class A

H series

■ Aircraft crashed en route to remote training site at night. All three crewmembers were killed and aircraft was destroyed on impact. Accident is under investigation.

V series

■ During formation flight at 30 to 60 feet agl, Chalk 4 crew noted sparks coming from exhaust of Chalk 3. Chalk 3 descended into trees, killing one and injuring three. Accident is under investigation.

Class B

H series

■ Engine failed at 100 feet agl. During autorotation and upon contact with ground, main rotor blades contacted tail boom, and tail rotor separated. There were no injuries. Accident is under investigation.

Class E

H series

■ During before-takeoff hover checks, pilot noticed that cyclic was binding and hard to move with friction and force trim off. Aircraft was landed and mission canceled. Maintenance found that cyclic jackshaft bearings were dirty and dry. Bearings were cleaned and lubricated and aircraft released for flight.

V series

■ En route to training area at night, crewmembers heard loud report that seemed to come from rear of aircraft. Aircraft simultaneously yawed to right. Precautionary landing was made without incident. Cause unknown.

UH60



Class C

A series

■ Aircraft was ground-taxiing on ramp when main-rotor blades struck telephone pole. All four tip caps were damaged and required replacement.

■ During single-engine roll-on landing, rated student pilot touched down nose high, applied excessive aft cyclic, and reduced collective pitch. Main rotor blades contacted tail boom and severed tail rotor drive shaft.

Class E

A series

■ During cruise flight, crew detected odor of burning rubber or plastic. Windshield anti-ice was turned off and then on, and pilot's windshield anti-ice was determined to be faulty. A crack with burn signs was discovered at the bottom right corner of the pilot's windshield. Maintenance replaced windshield.

■ During postflight after NVG training flight, VHF/FM antenna was found to be broken in half and all four main rotor blades scratched. Suspect main rotor blades contacted antenna due to excessive aft cyclic application during approach to downslope area.

■ During runup, PC switched on fuel boost pump switch and No. 2 boost pump switch advisory light failed to illuminate. Maintenance replaced pressure switch after replacement of control panel didn't clear the problem.

■ During normal VMC takeoff, crew felt mild high-frequency vibration in airframe and pedals when passing through 55 KIAS and 600 feet agl. Pilot made precautionary landing, taxied to parking, and completed normal shutdown. Cause not reported.

L series

■ **Flight-related.** Aircraft was conducting external-load operations with an M119A1 howitzer. With hookup complete, aircraft ascended with sling leg caught on howitzer's breech assembly. As howitzer came off ground, it canted muzzle-down with its left wheel low.

Howitzer was set down on its left side, damaging the M187 mount assembly.

C12



Class C

D series

■ Lightning struck aircraft in flight. Postflight inspection revealed that lightning struck left prop and exited through left outboard flap.

Class E

D series

■ When pilot applied power to taxi from ramp after passenger dropoff, he sensed that right-side tires were flat. He canceled the mission and shut down the aircraft. Maintenance replaced two tires on right side. Suspect extreme cold (-34°F) caused tires to go flat.

F series

■ White smoke exited engine cowl during No. 1 engine start procedure. Maintenance cited excess fuel in burner can, and fuel-clearing procedure was begun. After 10 minutes, start was attempted with auto ignition on. No ITT indication ensued. Check valve on fuel purge system was stuck open, allowing fuel to fill up pressure container; following start, fuel was blown back into engine, flooding igniters.

H series

■ No. 2 engine torque began uncommanded rise from 49 percent to 110 percent for 5 seconds. Tgt also increased to 820° for 5 seconds. Reduction of power had no effect. Engine was shut down and aircraft returned to base, where it executed single-engine landing without incident. Fuel control unit on No. 2 engine was replaced.

K series

■ Oil-pressure warning light came on in cruise flight, followed by loss of oil pressure on No. 1 engine. Crew shut down engine and got clearance to return to home station (closest facility). During before-landing check, they noticed nose-gear-unsafe indication. After several recycling attempts, gear indicated down and safe, and aircraft landed without incident. Maintenance found a crack in the oil-to-fuel heat exchanger and a loss of three quarts of oil. Heat exchanger was replaced.

For more information on selected accident briefs, call DSN 558-2785 (334-255-2785).

Aviation messages

Recap of selected aviation safety messages

Aviation safety-action messages

AH-64-97-ASAM-04, 110905Z Feb 97, maintenance mandatory.

The No. 2L stringer on AH-64s with 1750 or more flight hours is susceptible to cracking. The purpose of this message is to direct a recurring preflight inspection of all AH-64s with 1750 or more flight hours before each flight unless a double reinforcement has been applied or the slot area has been closed. ATCOM contact: Mr. Howard Chilton, DSN 693-1587 (314-263-1587).

C-12-97-ASAM-01, 101909Z Mar 97, operational.

The FAA has issued airworthiness directives relating to aircraft icing. The purpose of this message is to identify changes required for operators manuals, provide recognition cues for flight crews, and to limit or prohibit use of various control devices in C-12 and other fixed-wing aircraft. ATCOM contact: Mr. Larry Nahlen, DSN 693-2046 (314-263-2046).

UH-60-97-ASAM-10, 121841Z Feb 97, maintenance mandatory.

Engineering testing has been completed and the retirement life for the Air Industries main support bridge (P/N 70400-08116-048) is reduced to 1400 hours. The purpose of this message is to annotate aircraft records to reflect the

new requirement and require removal of any subject parts that have reached 1400 hours. ATCOM contact: Mr. Jim Wilkins, DSN 693-2258 (314-263-2258).

UH-60-97-ASAM-11, 281530Z Feb 97, maintenance mandatory.

Engineering testing has resulted in changes in retirement life of six-lug main rotor blade cuffs. The purpose of this message is to annotate aircraft records to reflect the new requirements. ATCOM contact: Mr. Dave Scott, DSN 693-2045 (314-263-2045).

Safety-of-flight message

C-23-97-SOF-02, 141938Z Feb 97, emergency.

C-23-97-SOF-01 grounded all C-23B(Plus) aircraft due to suspected defects in rudder and elevator skins. ATCOM has since determined the aircraft to be airworthy. The purpose of this message is to release all C-23B(Plus) aircraft for flight. ATCOM contact: Mr. Jim Wilkins, DSN 693-2258 (314-263-2258).

Safety-of-use message

SOU-ATCOM-97-03, 071619Z Feb 97, urgent.

The lack of standard rigid reach pendants for hookup of certain loads presents a hazard to personnel, lift helicopters, and

the equipment being transported. The purpose of this message is to outline procedures to reduce the risks involved. ATCOM contact: Mr. Jim Wilkins, DSN 693-2258 (314-263-2258).

Maintenance-information messages

GEN-MIM-97-03, 051035Z Mar 97.

The purpose of this message is to advise aviation users of ATCOM's policy for corrosion prevention and control and use of specific corrosion preventive compounds. ATCOM contact: Ms. Gale Rahmoeller, DSN 693-5422 (314-263-5422).

OH-58D-MIM-97-02, 021120Z Jan 97.

The purpose of this message is to advise users of forthcoming changes to maintenance manual that will revise instructions for inspection/repair of Estane erosion strip. ATCOM contact: Mr. Dick Mooy, DSN 693-9315 (314-263-9315).

OH-58D-MIM-97-03, 111529Z Feb 97.

The purpose of this message is to advise users of changes to TM 55-1520-248-10 and TM 55-2840-256-23 concerning equivalent limits and nomenclatures between OH-58D and OH-58D(I) power turbine speed and main rotor speed limits. ATCOM contact: Mr. Jesse T. Gambee, DSN 693-9888 (314-263-9888).

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Class A Accidents

through February

		Class A Flight Accidents		Army Military Fatalities	
		96	97	96	97
1ST QTR	October	1	0	0	0
	November	0	0	0	0
	December	0	1	0	0
2ND QTR	January	1	2	0	2*
	February	0	0	0	0
	March	2		7	
3RD QTR	April	1		3	
	May	0		0	
	June	1		6	
4TH QTR	July	0		0	
	August	0		0	
	September	1		0	
TOTAL		7	3	16	2

*Excludes 1 USAF pilot trainee fatality



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